

CLAIMS

What is claimed is:

- 5 1. A switch for use in a network, comprising:
 a plurality of linecards, each including:
 a plurality of ports; and
 a plurality of processing units, wherein each processing unit is
 associated with at least one port, thereby distributing processing resources
10 amongst linecard ports.
2. The switch of claim 1, wherein additional linecards can be added to the plurality
 of linecards.
- 15 3. The switch of claim 1, wherein linecards can be removed from the plurality of
 linecards.
4. The switch of claim 1, wherein each linecard is designed to handle packets
 formatted in accordance with any respective one of a plurality of protocols.
- 20 5. The switch of claim 4, wherein:
 a first set of linecards in the plurality is designed to send and receive
 packets in accordance with an iSCSI protocol; and
 a second set of linecards in the plurality is designed to send and receive
25 packets in accordance with a Fibre Channel protocol.
6. The switch of claim 4, wherein one of the plurality of protocols is Infiniband.
7. The switch of claim 1, wherein the switch is capable of processing packets
30 without buffering the packets.

8. The switch of claim 1, wherein the switch is capable of processing packets at wire speed.

5 9. The switch of claim 1, wherein the switch is capable of receiving a packet at a first port of a first linecard destined for a virtual target and formatted in accordance with a first protocol, determining if the packet is a data or control packet, and if the packet is a data packet, sending the packet formatted in accordance with a second protocol to a physical target, all without buffering the packet,

10 10. The switch of claim 1, wherein the switch is capable of receiving a packet at a first port of a first linecard destined for a virtual target and formatted in accordance with a first protocol, determining if the packet is a data or control packet, and if the packet is a data packet, sending the packet formatted in accordance with a second protocol to a physical target, all at wire speed.

15 11. The switch of claim 1, wherein the switch is capable of performing a storage service at the request of a second device without any additional involvement of the second device.

20 12. The switch of claim 11, wherein the second device is a server.

13. The switch of claim 11, wherein the second device is a management station.

25 14. The switch of claim 11, wherein the storage service is any one of local mirroring, mirroring over slow link, snapshot, replication, third-party copy, periodic backup, and restore.

15. A switch for use in a network, comprising:
a plurality of linecards, each linecard including:
30 a plurality of ports;

a plurality of processing units, wherein each processing unit is associated with at least one port and is associated with a memory;

a CPU in communication with the processing units; and

a fabric in communication with each linecard, thereby allowing packets to
5 pass from an ingress linecard to an egress linecard.

16. The switch of claim 15, wherein:

each processing unit includes a packet aggregation and classification unit
and a packet processing unit; and

10 the associated memory includes a CAM and an SRAM.

17. The switch of claim 15, wherein the associated memory is included in the
processing unit.

18. The switch of claim 15, wherein the associated memory is associated with each
15 processing unit.

19. The switch of claim 15, wherein the switch further includes a traffic manager
in communication with each processing unit.

20. A switch for use in a system for storing and accessing data, the switch
20 comprising:

a plurality of linecards, each linecard including:

at least one port and at least one processing unit, wherein
25 each processing unit is associated with at least one port, and each
processing unit includes a classifier, a virtualizer, and a translator;
a CPU in communication with each processing unit; and
a fabric in communication with each linecard.

21. A switch for use in a system for storing and accessing data, the switch comprising:

a plurality of linecards, each linecard including:

at least one port, and

5 means associated with each port for performing wire speed processing of packets.

22. The switch of claim 21, wherein processing of packets includes at least one of data packet virtualization and data packet protocol translation.

10

23. The switch of claim 22, wherein processing of packets further includes classifying packets as data packets or control packets.

24. A storage network, comprising:

15 a switch including a plurality of linecards, each linecard including:

a plurality of ports, and

a plurality of processing units, wherein each processing unit

is associated with at least one port; and

a plurality of initiators and targets,

20

wherein a first set of initiators and targets operate in accordance with a first protocol and a second set of initiators and targets operate in accordance with a second protocol, and

wherein a third set of initiators and targets are local with respect to the switch and a fourth set of initiators and targets are remote with respect to the switch.

25

25. The storage network of claim 24, wherein the first set, the second set, the third set, and the fourth set are not mutually exclusive.

26. The storage network of claim 24, wherein the storage network includes a plurality of switches, each switch including a plurality of linecards, each linecard including a plurality of ports and a plurality of processing units, wherein each processing unit is associated with at least one port, wherein some of the switches are remotely located with respect to other switches.

27. The storage network of claim 24, wherein the switch is designed to process data packets, including virtualization and translation, without buffering the data packets.

28. The storage network of claim 24, wherein the switch is designed to process data packets, including virtualization and translation, at wire speed.

29. The storage network of claim 24, wherein each linecard is designed to handle packets formatted in accordance with any respective one of a plurality of protocols.

30. The storage network of claim 24, wherein additional linecards can be added to the plurality of linecards.

31. The storage network of claim 24, wherein linecards can be removed from the plurality of linecards.

32. The storage network of claim 24, wherein the storage network includes a plurality of switches, each including a plurality of linecards, each including a plurality of ports and a plurality of processing units, wherein each processing unit is associated with at least one port, and wherein additional switches can be added to the plurality of switches.

33. The storage network of claim 24, wherein the storage network includes a plurality of switches, each including a plurality of linecards, each including a plurality of ports and a plurality of processing units, wherein each processing unit

is associated with at least one port, and wherein additional switches can be removed from the plurality of switches.

- 5 34. The storage network of claim 24, wherein the storage network includes a plurality of switches, each including a plurality of linecards, each including a plurality of ports and a plurality of processing units, wherein each processing unit is associated with at least one port, wherein only one management station is required to manage the plurality of switches.

- 10 35. A storage network, comprising:

 a switch;

 a server in communication with the switch, the server operating in accordance with a first protocol;

- 15 a storage device in communication with the switch, the storage device operating in accordance with a second protocol;

 the switch having an input for receiving a data access command for a virtual target formatted in accordance with the first protocol; and

 the switch having an output for sending the data access command to a physical target formatted in accordance with the second protocol at wire speed.

20

36. The storage network of claim 35, wherein the switch includes a plurality of linecards, each linecard including a plurality of ports and a plurality of processing units, wherein each processing unit is associated with at least one port.

- 25 37. The storage network of claim 35, including a plurality of switches.

38. The storage network of claim 37, wherein only one management station is required to manage the plurality of switches.

39. The storage network of claim 37, wherein some of the switches are remotely located with respect to other switches.

40. The storage network of claim 35, wherein the server is remotely located with respect to the switch.

41. The storage network of claim 35, wherein the storage device is remotely located with respect to the switch.

42. A method for use by a device in a system for storing and accessing data, the method comprising:

receiving a packet from an initiator destined for a virtual target and formatted in accordance with a first protocol; and

sending the packet to a physical target formatted in accordance with a second protocol at wire speed.

43. A method for use by a device in a system for storing and accessing data, the method comprising:

receiving a packet from an initiator destined for a virtual target and formatted in accordance with a first protocol;

determining if the packet is a data or control packet;

if a data packet, sending the packet to a physical target formatted in accordance with a second protocol; and

wherein all of the above steps are performed without buffering.

44. The method of claim 43, wherein all of the steps are further performed at wire speed.